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YUCCA FREEMANII (ASPARAGACEAE) NEW TO ARKANSAS

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ABSTRACT

Yucca freemanii is documented from Arkansas and is recognized as a component of the vascular flora of Arkansas. In June and July 2014, the collection site was visited by Craig Frasier and a *Yucca* of unknown identity was photographed. The authors then collected herbarium specimens (including flowers in liquid preservative) and sterile rosettes/rhizomes for growth in a *Yucca* common garden. The plants at this site differ from populations of *Y. louisianensis* in southwestern Arkansas that have been under study for several years and are consistent with those of Shinners' description of *Y. freemanii*, a type specimen observed online, and herbarium specimens examined previously. Based on these data, we recognize *Y. freemanii* as a valid taxon and new to the Arkansas flora.

Shinners (1951) described *Yucca freemanii* from a specimen collected by H.A. Freeman in Bowie County, Texas, in 1950 and attributed the species to Texas and Louisiana based on specimens at Southern Methodist University (SMU) and the Missouri Botanical Garden (MO). Since its initial description, *Y. freemanii* has received diametrically opposed treatments from taxonomists, ranging from a valid species (Correll & Johnston 1970) to a synonym of *Y. flaccida* Haw. (Hess & Robbins 2002) or *Y. louisianensis* (Diggs et al. 2006). Diggs et al. indicated that until a thorough study was made of the complex of *Yucca* species in east Texas, they were following various authors in using *Y. louisianensis* for the common species of *Yucca* in east Texas and were including *Y. freemanii* within *Y. louisianensis*. They also noted that Shinners separated *Y. freemanii* from *Y. louisianensis* based on its glabrous inflorescences as well as other differences.

On 26 June, 29 June and 6 July 2014, the site of collection was visited by Craig Frasier to photograph an assemblage of rare species noted by Theo Witsell in a previous visit. During this visit, a *Yucca* of unknown identity was photographed (Figs. 3, 4, 5). Frasier shared digital images with Theo Witsell, who shared the images with the second author and Matt White. The second author determined that the plants mostly closely matched *Y. freemanii*, a taxon generally not recognized by taxonomists and not previously reported for Arkansas (Gentry et al. 2013). The site was visited by the authors on 20 July 2014, and the plants were re-photographed, herbarium specimens were collected (including flowers in liquid preservative), and sterile rosettes/rhizomes were collected for growth in Johnson's *Yucca* common garden (Figs. 2, 6). Character states of the plants at this site are consistent from plant to plant and are different from nearby populations of *Y. louisianensis* that have been under study by Johnson for several years. Also, the character states of the plants at the collection location are consistent with those of Shinners's description of *Y. freemanii* (Shinners 1951), an isotype of *Y. freemanii* observed online at TROPICOS (MO 1703856 & MO 1703857) (Tropicos 2014), and specimens identified as *Y. freemanii* previously examined by Johnson at BRIT (*Van Vleet 1631*) and also listed by Shinners (1951) as an example of *Y. freemanii*. There is no evidence that these plants are the result of hybridization/introgression or are the result of an escape from

cultivation. Based on these data, we recognize *Y. freemanii* as a valid taxon and new to the Arkansas flora.

Voucher specimens. **ARKANSAS**. Miller Co: Ravanna 7.5' Topo. Quad (AR-TX-LA), extreme sw Miller County, near LA and TX state lines, two small populations of plants growing in Bowie Series Soil (sandy loam), few flowers remaining on plants, leaves yellowish-green, thick, flaccid and somewhat succulent, inflorescence bright green, glabrous, thin-stemmed, with a hard and almost smooth surface, flowers greenish-white, nearly globose, small, ca. 3.0 cm long, growing with *Pteridium aquilinum*, *Toxicodendron radicans*, and *Physostegia digitalis*, 20 Jul 2014, *G.P. Johnson 5945A,B,C,D* (APCR). Rosettes A & B: along Co. Rd 1, 1.1 km SE of Ravanna, 33.05215° N, -94.03046° W, +/- 3m, 60 m elev., NW 1/4 of NE 1/4 of Sect. 5, T20S, R28W, powerline right-of-way on E side of road, flat area between ditch and cut-over woods edge. Rosettes C & D: along Co. Rd 1, 157 m NW of intersection with Co. Rd 80, 33.04568° N, -94.02663° W, +/-3m, 69 m elev., NE 1/4 of SE 1/4 of Sect. 5, T20S, R28W, powerline right-of-way on E side of road, flat area between ditch and pine stand.

These plants of *Yucca freemanii* occur in two populations at opposite ends of a 1 km segment of County Road 1 (Fig. 1). At both locations, the plants occur in a Bowie Sandy Loam Soil (Laurent 1984) at the highest point topographically. Due to the clonal nature of *Yucca*, what has been observed before in other stemless *Yucca* seems to be true for *Y. freemanii* — what appears to be a large number of individual plants above ground are actually one or a few plants whose rosettes are connected below ground by an extensive "woody" rhizome system. When the plants were collected for herbarium specimens and dug as rosettes/rhizomes for a *Yucca* common garden, there was an extensive rhizome system and rosettes of various sizes (and ages?) and distances from each other were all connected below ground. This would also account for the uniformity of character states within the plants. As is unfortunately often the case in *Yucca*, while flowers were abundant this year in each population, fruit formation was absent, presumably due to an absence of pollinating moths.

Historically, *Yucca freemanii* has been confused with *Y. louisianensis* (Shinners 1951) and in their area of sympatry in northeast Texas has been recently treated as a synonym of it (Diggs et al. 2006). Diggs et al. noted that individuals of *Y. louisianensis* with glabrous inflorescences are occasionally found and that these were recognized as *Y. freemanii* by Shinners; they also noted that Shinners recognized other differences between *Y. freemanii* and *Y. louisianesis*. As has been mentioned by many authors, real differences between *Yucca* taxa are often difficult if not impossible to see in herbarium specimens. And while Shinners' description of *Y. freemanii* is excellent, until the species is seen in the field and compared directly to living plants of *Y. louisianensis* (Fig. 7), those differences cannot be fully appreciated, especially in herbarium specimens. As called for by Diggs et al. (2006) and Smith (1988), the first author (Johnson) is making a field, herbarium and nomenclatural study of *Yucca* in the southeastern USA, including the Arkansas-Louisiana-Texas area, and keys, descriptions, and nomenclature for the taxa of *Yucca* recognized will be forthcoming. Until that time, the key in Shinners (1951) will separate *Y. freemanii* from *Y. louisianensis*.

1. Leaf margins minutely toothed or smooth, not shredding ..... **Yucca pallida** McKelvey
1. Leaf margins shredding into prominent white threads (these often largely disappearing late in the year).

    2. Inflorescence spicate-racemose, occasionally with 1–2 branches near base, borne close to or even partly below the summit of the leaves; plant 0.6–1.2 m high, flowering late April-mid May ... . **Yucca arkansana** Trel.
    2. Inflorescences panicled, with branches in more than half its length, elevated well above the leaves; plant 1–4 m high, flowering late May-July.

3. Panicle branches glabrous; scape 1–1.8 m high, slender (4–5 mm. thick at base of inflorescence); leaves 1–4 cm wide, broadly acute or subacuminate, rather soft and limp; flowering mid June-July ..... **Yucca freemanii** Shinners

3. Panicle branches densely pubescent; scape 1.5–4 m. high, stout (5–10 mm. or more thick at base of inflorescence); leaves 0.4–2 cm wide, narrowly acute or acuminate, rather firm and stiff; flowering late May-June (sporadically later) ..... **Yucca louisianensis** Trel.

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We gratefully acknowledge Theo Witsell and Matt White for their contributions to this paper. Although he did not see *Yucca freemanii* there, Theo Witsell discovered this site and directed Craig Frasier to it as a location for photography of several species of rare plants. Matt White examined the first digital photographs taken of the site by Craig Frasier and concluded that the *Yucca* seen in the photographs matched *Y. freemanii*, a taxon that he has long considered to be distinct from *Y. louisianensis*.

LITERATURE CITED

Correll, D.S. and M.C Johnston. 1970. Manual of the Vascular Plants of Texas. Texas Research Foundation, Renner, Texas.

Diggs, G.M., B.L. Lipscomb, M.D. Reed, and R.J O'Kennon. 2006. Illustrated Flora of East Texas, Vol. 1:Introduction, Pteridophytes, Gymnosperms, and Monocotyledons. Sida Bot. Misc. 26.

Gentry, J.L., G.P. Johnson, B.T. Baker, C.T. Witsell, and J.D. Ogle (eds.). 2013. Atlas of the Vascular Plants of Arkansas. Univ. of Arkansas Herbarium, Fayetteville.

Hess, W.J. and R.L. Robbins. 2002. *Yucca* (Agavaceae). Pp. 423–439, in Flora of North America North of Mexico, Vol. 26. Oxford Univ. Press, New York and Oxford.

Shinners, L.H. 1951. *Yucca freemanii*, a new species from northeastern Texas. Field & Lab. 19: 168–170.

Smith, E.B. 1988. An Atlas and Annotated List of the Vascular Plants of Arkansas (ed. 2). Dept. Of Botany & Microbiology, Univ. of Arkansas, Fayetteville.

Tropicos. 2014. Tropicos.org: Nomenclatural, bibliographic, and specimen data accumulated in MBG's electronic databases. Missouri Botanical Garden. <http://www.tropicos.org/Image/64684> & <http://www.tropicos.org/Image/64683> Accessed 16 Aug 2014

Laurent, G. 1984. Soil Survey of Lafayette, Little River, and Miller Counties, Arkansas. USDA, Soil Conservation Service, Washington, D.C.

Figure 1. *Yucca freemanii* site along Co. Rd 1, Miller Co., Arkansas, 20 Jul 2014. Photo by George Johnson.

Figure 2. Plants of *Yucca freemanii* collected for herbarium specimens/common garden transplantation, Miller Co., Arkansas, 20 Jul 2014. Photo by George Johnson.

Figure 3. Immature inflorescences of *Yucca freemanii* behind *Physostegia digitalis* and *Pteridium aquilimum*, Miller Co., Arkansas, 26 Jun 2014. Photo by Craig Frasier.

Figure 4. Mature flower of *Yucca freemanii*, Miller Co., Arkansas, 6 Jul 2014. Photo by Craig Frasier.

Figure 5. *Yucca freemanii* whole plant with basal rosette, inflorescence and flowers in bud, Miller Co., Arkansas, 29 Jun 2014. Photo by Craig Frasier.

Figure 6. Whole plant of *Yucca freemanii* with a few remaining flowers, Miller Co., Arkansas, 20 Jul 2014. Photo by George Johnson.

Figure 7. *Yucca louisianensis* in fruit, Miller Co., Arkansas, 20 Jul 2014. Photo by George Johnson.